Onboard indicator needle with luminescent lighting

The invention relates to the field of onboard indicators with luminous needles for motor vehicle dashboards and more particularly the mounting and the connection of these luminous needles.

Luminous needles such as these exist on numerous motor vehicle dashboard indicator dials. They are designed to indicate, as a function of their angular swing over a determined sector of the dial, a physical quantity relating to the driving of the vehicle.

The luminous needles may, on the basis of a fixed light source close to their rotational spindle, receive their light by virtue of light guides provided in their hub and be arranged so as to diffuse the light over their length. In this case, in their rotational motion to indicate a physical quantity, the light source remains fixed and there is no problem with its electrical energizing. However, this mode of lighting requires a hub of complex design and the brightness of the needle is not optimal.

Luminous needles may also contain their own light source, which is then energized electrically by conductors provided in the hub. This method eliminates the drawback above, but the light source turning with the needle and the electrical energizing source necessarily being fixed on the electronic card of the dashboard, the electrical link between the two sources is necessarily dynamic.

The proposal has been contemplated, for example in document US5797345, to mount sliding contacts linked to the light source, on the hub of the needle, and, in contact with the said sliding contacts, fixed contacts linked to the energizing source.

This second solution has the drawback however of requiring on the one hand the presence of sliding contacts, always prone to wear by friction and to fouling, to the extent of cutting off the energy supply to the light source. On the other hand, the complexity of the mounting of the electrical circuits gives rise to a not inconsiderable cost.

The present invention proposes, for this second solution, an improvement aimed at eliminating the presence of any sliding contact while ensuring simple mounting of the needle.

For this purpose, the invention relates to an onboard indicator with luminous needle, which indicator is mounted on a dashboard electronic card, the needle comprising an arm movable in rotation with a light source and the card a source for energizing the light source. The indicator is characterized in that the light source comprises a first part of a support of flexible material covered with a photophore substance subjected to an electric voltage from the energizing source to which it is linked electrically by a flexible electrical link formed by a second part of the insulating flexible support serving as substrate for at least two conducting tracks.

In particular, the second part of the flexible support is attached to at least two pins that can each be fitted into an electrical contact attached to the electronic card, each pin being in contact with one or other of the two conducting tracks.

When the indicator is called on to indicate a physical quantity, its needle pivoting about its spindle, the electrical link unwinds around the hub of the needle. Any sliding contact has thus been eliminated.

The needle thus comprises a minimum of components to be mounted in a minimum space.

Preferably also, at its end attached to the electronic card, the flexible film is attached to at least two pins that can each be fitted into an electrical contact attached to the electronic card, each pin being in contact with one or other of the two conducting tracks.

This arrangement allows mounting of the indicator in a single operation by plugging in of the electrical connections of the light source of the needle with its energy supply and mechanics of the spindle of the needle on its drive motor.

Advantageously, the pins are assembled on a support of pins that can be secured into a housing for retaining the pins support provided in the needle to facilitate mounting.

Advantageously again, the pins support retaining housing and the electrical contacts of the electronic card are arranged so as, in the mounted position of the indicator, to allow the plugging of the pins into the contacts, and so as, in the operating position of the indicator, to avoid the colliding of the housing for retaining the pins support with the pins support, doing so in order not to block the operation thereof or hinder the swing thereof.

Advantageously still, the pins support and the retaining housing are arranged so as to be detached upon the powering-up of the motor of the indicator.

The invention will be better understood by virtue of the following description of the onboard indicator according to the invention and of the drawing accompanying it in which:

- Figure 1 represents a sectional profile view of the needle of the onboard indicator according to the invention, the needle being in the mounted position;
- Figure 2 represents a view from below of the needle in the same position, the electronic card and the dial being removed;
- Figure 3 represents a perspective view of the pins support;
- Figure 4 represents a sectional profile view of the needle of the onboard indicator of the invention, the needle being in the operating position; and
- Figure 5 represents a view from below of the needle in the same position, the electronic card, the flexible film and the dial being removed.

With reference to Figure 1, the onboard indicator 1 of the vehicle dashboard comprises a dial 14, made of polycarbonate for example, bearing graduations indicative of physical quantities relating to the progress of the vehicle, at the centre thereof, and an opening 40 through which there passes a hub 15 attached to a spindle 19 of a motor 20, for example a stepper motor, mounted on an electronic card 21.

The hub is extended by a needle 10 running towards the graduations of the dial 14 through an arm 11 completely covered by a transparent fairing 12. The stepper motor 20 is arranged so as to make the needle pivot as a function of the physical quantity to be displayed on the dial.

Between the visible part of the arm 11 and the fairing 12 is glued, onto the arm, a first part 30' of a support partially covered with a layer of photophore material, for example an electroluminescent ink, over a determined area so as to form the pointer (not represented) of the needle.

According to the invention, the support 30 runs beyond the arm 11 of the needle 10 through a second band-shaped part 30" extending along the hub 15, but free, to pass through the dial 14 via the opening 40, then around the hub 15 along a spiral S surrounding the said hub, under the dial, of a sufficient length specified later.

To do this, the support 30 is folded over on itself at 90°, at the height of the hub, forming a fold 45.

The support 30 is electrically insulating; in its second part it comprises two parallel conducting tracks 31 and 32 linked to either side of the pointer so as to energize it electrically in a suitable manner, and extending without interruption up to its free end. On the first part 30' of the support 30 these two conducting tracks act as electrodes over the entire useful length of the needle or at least its visible part and provide for the excitation of the electroluminescent ink. One of the tracks 31 is in contact 41 with a pin 23 attached to the support 30, and the other 32 with another pin 24 also attached to the latter. The contacts are fairly distant from the support 30 so as to provide for plug-in mounting which will be explained further on.

Figure 2 shows the spiral S formed by the band 30" around the hub 15 and the layout of the pins 23 and 24 attached to its free end.

As the band 30" is flexible, the pins 23, 24 are held parallel to one another in the manner of the pins of an ordinary electric plug by means of a pins support 25, as is shown in Figure 3.

The pin support 25 comprises a central spigot 26, and two equidistant holes 43 and 44 in which the ends 33

and 34 of the pins 23 and 24 are inserted. The pins run out of the support 25 away from the central spigot 26.

The band 30" is glued to the pins 23 and 24, and, to avoid an electrical short-circuit, insulating bushings 51 and 52 have been disposed on the pins 23 and 24 to insulate the pin 23 from the track 32 and the pin 24 from the track 31. Thus the pin 23 is in electrical contact 41 only with the track 31 and the pin 24 in electrical contact 42 only with the track 32.

Under the needle 10, a spigot 16 has been provided in such a way as to be fairly close to the hub 15 so as to pass into the opening 40, in which a housing 17 retaining the support 25 of the pins 23 and 24 has been made.

The spigot 16 of the needle 10 is of such a length that, when the spigot 26 of the pin support 25 is engaged in the housing 17, the pins 23 and 24 can be plugged into electrical contacts 22 attached to the electronic card 21. The housing 17 is arranged, as may be seen in Figure 5, so as to retain the spigot 26 by lateral snap-fastening.

When, in a mounted position of the needle, the spigots 16 and 26 are aligned and the pins are plugged into the contacts 22, the needle is situated outside of its operating range on the dial.

Consequently, the length of the band 30" is sufficient to allow the needle to pivot not only over the whole of the said operating range, but also, beyond, up to the mounted position of the needle defined previously.

During normal operation of the indicator 1, with reference to Figure 4, the needle 10 is in an operating position situated somewhere in a sector determined by its swing about its spindle 19, in general by an angle

of 180° or more, but less than a complete revolution. In this case, the support 25 of the pins 23, 24, which are plugged into the contacts 22, is not situated in the said sector. It remains out of reach of the spigot 16 of the needle 10 which is not hindered in its indication motion.

For the mounting of the needle, the spigot 26 of the support 25 of the pins 23, 24 is engaged into the housing 17 and the pins are plugged into the contacts 22 at the same time as the hub 15 is plugged into the spindle 19 of the motor 20. The needle is then in a mounted position as in Figure 1, outside of the sector determined by its sweep while operating.

For placement in the operating position, the needle 10 is forced, manually or by starting up the motor 20, to turn so as to bring it into the sector. Through this action, the spigot 26 is forced to leave the spigot 16.

During operation, the electrodes of the first part 30' of the support provide for the excitation of the photophore material which becomes luminous. Regardless of the position of the needle, the energizing of the first part is provided for by the electrodes on the second part which by virtue of the flexibility of the support 30" follow the motion thereof while remaining connected to the source of current.